

What is claimed is:

1. A surgical retraction apparatus for use with a surgical port device having a tubular section that is operably inserted into tissue, the surgical retraction apparatus comprising:

a plurality of rigid retraction members disposed about a central axis that move radially with respect to said central axis between a closed state and an open state, wherein in said closed state said retraction members form a central opening that is adapted to closely fit around the tubular section of the surgical port device.

2. A surgical retraction apparatus according to claim 1, wherein:

said retraction members are L-shaped, each having an arm that projects along a direction substantially parallel to the central axis and a segment that projects along a directional substantially perpendicular to the central axis.

3. A surgical retraction apparatus according to claim 2, further comprising:

a planetary gear train that controls radial movement of said retraction members with respect to said central axis.

4. A surgical retraction apparatus according to claim 3, wherein:

said planetary gear train comprises a drive gear, a sun gear that meshes to said drive gear, and a plurality of planetary pinion gears corresponding to said plurality of retraction members.

5. A surgical retraction apparatus according to claim 4, wherein:

the section of each retraction member comprises a rack surface that meshes to a corresponding planetary pinion gear to effectuate radial movement of the retraction member in response to rotation of the drive gear and sun gear operably coupled thereto.

6. A surgical retraction apparatus according to claim 2, further comprising:

a plurality of cables, operably coupled to said segments of said retraction members, that controls radial movement of said retraction members with respect to said central axis.

7. A surgical retraction apparatus according to claim 6, wherein:

each one of said plurality of cables, being operably coupled between a corresponding segment and a mounting element affixed to a rotating element, slides past a stationary post corresponding thereto.

8. A surgical retraction apparatus according to claim 2, further comprising:

a plurality of lever arms, operably coupled to said segments of said retraction members, that controls radial movement of said retraction members with respect to said central axis.

9. A surgical retraction apparatus according to claim 8, wherein:

each one of said plurality of lever arms is operably coupled between a corresponding segment and a mounting element affixed to a rotating element.

10. A surgical retraction apparatus according to claim 1, wherein:

said retraction members form a tubular structure in the closed state that has a diameter in the range between 10 mm and 20 mm.

11. A surgical retraction apparatus according to claim 1, wherein:

said retraction members form a broken tubular structure in the open state that has a diameter in the range between 30 mm and 50 mm.

12. A surgical retraction apparatus according to claim 1, wherein:

said retraction members are formed from stainless steel.

13. A surgical apparatus comprising:

a surgical port body having a tubular section that is operably inserted into tissue;
and

a retraction subsystem having a plurality of rigid retraction members disposed about a central axis that move radially with respect to said central axis between a closed state and an open state, wherein in said closed state said retraction members form a central opening that is adapted to closely fit around the tubular section of the surgical port body.

14. A surgical apparatus according to claim 13, wherein:

said retraction subsystem further comprises a planetary gear train that controls radial movement of said retraction members with respect to said central axis.

15. A surgical apparatus according to claim 13, wherein:

said retraction subsystem comprises a plurality of cables, operably coupled to said retraction members, that controls radial movement of said retraction members with respect to said central axis.

16. A surgical apparatus according to claim 15, wherein:

each one of said plurality of cables, being operably coupled between a corresponding retraction member and a mounting element affixed to a rotating element, slides past a stationary post corresponding thereto.

15. A surgical apparatus according to claim 13, wherein:

said retraction subsystem comprises a plurality of lever arms, operably coupled to said retraction members, that controls radial movement of said retraction members with respect to said central axis.

16. A surgical apparatus according to claim 15, wherein:

each one of said plurality of lever arms is operably coupled between a corresponding retraction member and a mounting element affixed to a rotating element.

17. A surgical apparatus according to claim 13, wherein:

said retraction members form a tubular structure in the closed state that has a diameter in the range between 10 mm and 20 mm.

18. A surgical apparatus according to claim 13, wherein:

said retraction members form a broken tubular structure in the open state that has a diameter in the range between 30 mm and 50 mm.

19. A surgical method comprising:

a) providing a surgical device comprising a port body including a tubular section in addition to a retraction subsystem disposed about the tubular section, wherein the retraction subsystem has a plurality of rigid retraction members disposed about a central axis that move radially with respect to said central axis between a closed state and an open state, wherein said retraction members are configured in said closed state to form a central opening closely fits around the tubular section of said port body;

b) inserting said tubular section of said port body through tissue and positioning portions of said retraction members into regions between said tubular section and the tissue;

c) manipulating the retraction subsystem to move the retraction members radially away from the central axis to thereby retract the tissue and increase the size of the opening through the tissue; and

d) applying force to said tubular section of the port body in a proximal direction to remove the port body out of the retraction system.

20. A surgical method according to claim 19, wherein:

said retraction subsystem is positioned proximal to the tissue while said tubular section is inserted through the tissue, and subsequently slide distally relative to said tubular section such that said retraction members are positioned into regions between said tubular section and the tissue.

21. A surgical method according to claim 19, further comprising:

f) manipulating the retraction subsystem to move the retraction members radially inward to the central axis; and

g) applying a force to the retraction subsystem in a proximal direction to remove the retraction subsystem from the opening through the tissue.

22. A surgical method according to claim 19, wherein:

the manipulating of said retraction subsystem is carried out by a planetary gear train that controls radial movement of the retraction members.

23. A surgical method according to claim 19, wherein:

the manipulating of said retraction subsystem is carried out by a plurality of cables, operably coupled between said retraction members and a rotating element, that control radial movement of the retraction members.

24. A surgical method according to claim 19, wherein:

the manipulating of said retraction subsystem is carried out by a plurality of lever arms, operably coupled between said retraction members and a rotating element, that control radial movement of the retraction members.

25. A surgical method according to claim 19, wherein:

the retraction members of said retraction subsystem form a tubular structure in the closed state that has a diameter in the range between 10 mm and 20 mm.

26. A surgical method according to claim 13, wherein:

the retraction members of said retraction subsystem form a broken tubular structure in the open state that has a diameter in the range between 30 mm and 50 mm.